Claims

[c1] 1.An electric motor cooling assembly, comprising:

a housing;

a stator disposed within the housing, the stator operable for generating a magnetic field;

a rotor disposed within the housing, the rotor operable for receiving the magnetic field and generating a torque;

a winding operatively connected to the stator;

an end-winding integrally formed with the winding;

a jet impingement device operable for exposing the end-winding to a temperature controlled stream of fluid.

[c2] 2.The assembly of claim 1, wherein the jet impingement device comprises an inlet, the inlet operable for introducing and exposing the temperature controlled stream of fluid to the end-winding.

[c3] 3.The assembly of claim 1, wherein the jet impingement device comprises an outlet, the outlet operable for removing fluid from the housing.

[c4] 4.The assembly of claim 2, wherein the inlet comprises a nozzle, the nozzle operable for directing the temperature controlled stream of fluid to the end-winding.

[c5] 5.The assembly of claim 1, wherein the temperature controlled stream of fluid comprises air.

[c6] 6.The assembly of claim 1, wherein the jet impingement device comprises a temperature controlled fluid generating device.

[c7] 7.The assembly of claim 1, wherein the jet impingement device comprises a pathway for the temperature controlled fluid from the temperature controlled fluid generating device to the inlet.

[c8] 8.A method for transferring heat between a stream of fluid impinging the surface of an electric motor end-winding and an electric motor end-winding, comprising:

controlling the temperature of a volume of fluid;
establishing a stream of fluid from the volume of fluid to an inlet;
delivering the temperature controlled fluid from the inlet to the end-winding such that heat is transferred between the surface of the end-winding and the stream of fluid impinging the surface of the end-winding; and
removing fluid from the electric motor via an outlet.

[c9] 9.The method of claim 8, wherein the temperature controlled fluid comprises air.

[c10] 10.The method of claim 8, wherein the temperature controlled fluid is generated in a fluid generating device.

[c11] 11.The method of claim 10, wherein the fluid generating device comprises a pathway for the temperature controlled fluid from the temperature controlled fluid generating device to the inlet.

[c12] 12.An electric motor, comprising:
a housing;
a stator disposed within the housing, the stator operable for generating a magnetic field;
a rotor disposed within the housing, the rotor operable for receiving the magnetic field and generating a torque;
a winding operatively connected to the stator;
an end-winding comprising the ends of the stator winding, integrally formed with the winding;
a jet impingement device operable for exposing the end-winding to a temperature controlled stream of fluid.

[c13] 13.The electric motor of claim 12, wherein the housing comprises an inlet, the inlet operable for introducing and exposing the temperature controlled fluid to the end-winding.

[c14] 14.The electric motor of claim 12, wherein the housing comprises an outlet operable for removing fluid from the housing.

[c15] 15.The electric motor of claim 13, wherein the inlet comprises a nozzle, the nozzle operable for directing the temperature controlled stream of fluid to the end-winding.

[c16] 16.The electric motor of claim 12, wherein the temperature controlled stream of fluid comprises air.

[c17] 17.The electric motor of claim 12, wherein the jet impingement device comprises a temperature controlled fluid generating device.

[c18] 18.The electric motor of claim 12, wherein the jet impingement device comprises a pathway for the temperature controlled fluid from the temperature controlled fluid generating device to the inlet.